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ALGAE NOVAE ET MINUS COGNITAE, I

BY

WILLIAM ALBERT SETCHELL

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Pleurocapsa conferta (Kuetz.) comb. nov.

Palmella conferta Kuetzing, Phyc. Germ., p. 149, 1845; Tab. Phyc., vol. 1, p. 12, pl. 16, fig. iv, 1845–49; Spec. Algarum, p. 213, 1849.

Pleurocapsa amethystea var. Johs. Schmidt, in H. Jönsson, Mar. Alg. Iceland, iv, p. 378, 1903; Mar. Alg. East Greenl., p. 70, 1904. Börgesen, Mar. Alg. Faeröes, p. 524, 1902. Forti, in De Toni, Syll. Alg., vol. 5, p. 121, 1907.

There occurs on *Rhodochorton Rothii,* on both coasts of the United States, and on the west (or northwest) coasts of Europe, a not infrequent epiphyte, which has come to be known as a variety of *Pleurocapsa amethystea* Rosenv. The type of the species of Rosenvinge is found on *Rhizoclonium riparium* f. *validum* (cf. Rosenvinge, *Groenl. Havalger,* p. 967, fig. 57, 1893). Whether the epiphyte on *Rhodochorton* is specifically identical or not, is not to be settled in this article. An examination of the description by Schmidt and of a specimen distributed by Boergesen (no. 546) from the Faeröes, together with a comparison with the type specimen of *Palmella conferta* Kuetzing, which I have been able to make through the kindness of Mme. Weber-van Bosse, convinces me that the two plants are the same. Consequently I have proposed the new combination *Pleurocapsa conferta.*

Pleurocapsa conferta is described superficially by Kuetzing (*Phyc. Germ.,* p. 149) as forming microscopic, green, and firm masses which surround the filaments of the host with a papillose mass containing very small "gonidia." The type locality is

given as Cuxhaven, on the North Sea shore, Germany. The figure given by Kuetzing in the *Tabulae Phycologicae* (vol. 1, pl. 16, fig. iv, 2) is also good and convincing.

The description given by Johs. Schmidt in Helgi Jönsson's paper on the *Marine Algae of Iceland* (iv, p. 378) is both full and exact. He deals also with the relationship existing between his unnamed variety and the *Pleurocapsa amethystea* of Rosenvinge (*Groenl. Havalger, loc. cit.,* and *Alg. Mar. du Groenl.,* p. 163, fig. 57, 1894). The form on *Rhodochorton Rothii* passes through just such stages as indicated in Rosenvinge's figures but proceeds farther as indicated by Schmidt. The color in the earlier stages is usually more bluish, often deep blue, even at times the bluish purple of the amethyst, but the cell contents of the later stages are a dirty verdigris green. The walls and surrounding jelly are hyaline. The cells become smaller and smaller as division proceeds.

It appears from my own examinations, that this species is probably coincident in its range with its host. In North America it occurs on the north shore of New England (Collins!, Setchell!) as well as on the south coast (Holden!), and on the Pacific coast of North America it ranges from St. Michael, Alaska (Setchell!) down to Monterey, California (Setchell!, Nott!) at least. Especially good colonies of *Pleurocapsa conferta* are abundant in the specimen (of my copy at least) distributed under no. 49 of the *Phycotheca Boreali-Americana* (Nahant, Mass., Setchell!) and fair representatives under no. LVI of the same distribution (Monterey, California, C. P. Nott!).

Brachytrichia Quoyi (Ag.) Bornet is credited to the coast of California by Bornet and Flahault (*Rev. Nost. Het.,* ii, p. 373, 1886,) on the authority of a specimen collected by (or communicated by) Grunow. It seems to have escaped other collectors, so far as I know, at least, but a specimen was collected in August, 1911, by J. E. Guernsey at Laguna Beach in Orange County, California. It seems to be typical and agrees with specimens from the East Indies in habit and structure.

The genus *Coïlodesme* was founded by Stroemfelt in 1886 to receive an Icelandic plant to which he gave the name *C. bulligera* (*Algveget Isl., Kuster,* p. 48, pl. 2, figs. 9–12). It was enlarged

by Kjellman (*Undersök. of någ till Slägt. Adenocytis,* p. 4, figs. 1–8, 1889,) to receive a plant imperfectly described by Ruprecht as var. *californica* under *Adenocystis Lessonii* (*Tange Och.,* p. 291, 1851). A third species was added by De Alton Saunders (*Algae* [*of the Harriman Expedition*], p. 421, pl. 48, 1901), who gave it the name of *C. linearis* but which Setchell and Gardner (*Algae N. W. America,* p. 241, 1903) later identified as the *Asperococcus Cystoseirae* Ruprecht (*Tange Och.,* p. 370, 1851) and changed the name to *C. Cystoseirae.* The genus consequently, has three species attributed to it.

For some time there has existed in my mind a doubt as to the exact identity of *Coilodesme californica* (Rupr.) Kjellm. De Alton Saunders described and figured a plant under this name (*Proc. Calif. Acad. Sci.,* ser. 3, Bot., vol. 1, p. 160, pl. 29, figs. 1–3, 1898) which is common on the coast of California on *Cystoseira Osmundacea.* It is a plant which often reaches a large size, is cylindrical at first, but collapses more or less later, is thin walled and wrinkled. Its color is light yellowish brown, changing often to an olive green in drying. It has been distributed in Collins Holden and Setchell, *Phycotheca Boreali-Americana* under no. I, and in Tilden's *North American Algae,* under no. 354.

There is, however, still another species of *Coilodesme* existing on the coast of California and also found growing upon the fronds of *Cystoseira Osmundacea.* This species never reaches the size of the last, is smooth, firm, comparatively thick-walled, strongly flattened, and of a dark brown color, even from the first. It looks very much like *Halosaccion fucicola,* but is brown and flattened. On comparing the descriptions of Ruprecht (*loc. cit.*) and of Kjellman (*loc. cit.*), it seems fairly certain that it is this flattened, smooth, dark brown plant which is to be referred to *Coilodesme californica,* leaving the ample, thin, wrinkled, and lighter colored plant as an undescribed species. The four species of *Coilodesme,* thus distinguished, may be arranged as follows:

FRONDS FLATTENED, LONG STIPITATE, FIRM, DARK BROWN

1. *C. bulligera* Stroemf. More or less swollen and bullate, especially on the edges.

   Stroemfelt, Algveget. Isl. Kuster, p. 48, pl. 2, figs. 9–12, 1886.
   Phycotheca Boreali-Americana, no. 923, 1902!

2. *C. californica* (Rupr.) Kjellm. Flattened and smooth on the edges, not at all swollen.

Ruprecht, Tange Och., p. 291, 1851 (sub *Adenocystis* (*Lessonii* var.?) *californica.*)

Kjellman, Undersökn. af såg. till Slägt. Adenocystis, p. 8, figs. 1–8, 1889.

Fronds inflated, very short stipitate, cylindrical, wrinkled, thin and membranaceous, light brown

3. *C. Cystoseirae* (Rupr.) Setchell & Gardner. Elongated, narrowly cylindrical.

Ruprecht, Tange Och., p. 370, 1851 (sub *Asperococcus Cystoseirae*).

Saunders, Algae (of the Harriman Expedition), p. 421, pl. 48, 1901, and in Phycotheca Boreali-Americana, no. 824, 1901 (sub *Coilodesme linearis*).

Setchell & Gardner, Algae N. W. America, p. 241, 1903; Phycotheca Boreali-Americana, no. 1128, 1903.

4. *C. amplissima* sp. nov. C. thallo amplo, ad 30 cm. alto et 7.5 cm. lato, late cylindrico, apice obtuso rotundatoque, basi contracto brevissimo-stipitatoque, cavo, primum inflato demum collabente, irregulariter undulato, luteo-fusco; parietibus tenuibus, membranaceis.

Saunders, Proc. Calif. Acad., ser 3, Bot., vol. 1, p. 160, pl. 29, figs. 1–3, 1898; Phycotheca Boreali-Americana, no. I, 1899 (both sub *C. californica*).

Tilden, Amer. Algae, no. 354, 1900 (sub *C. californica*).

From Yakutat Bay, Alaska (Saunders) to San Pedro, California (Mrs. S. P. Purdy!), growing on *Cystoseira Osmundacea* and *Cystophyllum geminatum.*

There is little need for giving a detailed description of *C. amplissima,* since it is really the plant better known than *C. californica.* The figure of Saunders, and the specimens distributed, make plain what is meant. By the thinness of its membrane, lack of flattening, particularly in the early stages, its very short stipe (2 mm. or less), it is clearly allied to *C. Cystoseirae* and quite distinct from *C. bulligera* and *C. californica.* In distribution on the Pacific coast of North America, *C. bulligera* and *C. Cystoseirae* occupy the northern portion, while *C. californica* and *C. amplissima* occupy the southern portion. It may be that *C. amplissima* will be found to pass over into the forms of *C. Cystoseirae* (cf. Setchell & Gardner, *loc. cit.*, p. 241), but it seems best to keep it distinct at present.

HAPTEROPHYCUS Setchell et Gardner gen nov. Ralfsiacearum

Frons decumbens, dorsiventralis, orbicularis; ramis e centro radiantibus, obesis, curtis, dichotomo multiplo ramosis, infra canaliculatis, marginibus crenatis, axillis latis rotundisque, apicibus latis obtusisque; soris sub cuticulo orientibus mox superficialibus, latis et inconspicuis; sporangiis (unilocularibus) pyriformibus, lateralibus in cellulis basilaribus paraphysium multicellularum multo superantium; intus frons cellulis magnis, cylindricis, hyalinis, in seriebus ad superficiem e planitie horizontali media utrinque curvatis, compositis; cellulis superficialibus parvioribus endochromatibus farctis; gametangiis ignotis.

H. canaliculatus Setchell and Gardner sp. nov.

Frondibus ad 5 cm. latis, luteo-fuscis; sporangiis 65–75μ longis, 18–25μ latis; paraphysibus 4–7-cellularibus, 6–7μ latis. In saxis, intra limites fluxuum maris, apud "San Pedro," in ditione Californiensi, ubi detexit N. L. Gardner.

The new genus and species here proposed was found by Dr. N. L. Gardner, growing on rocks in the litoral zone in the neighborhood of San Pedro, California. On the rocks it looks so much like the holdfasts of some member of the Laminariaceae, that it seems fitting to choose for it the generic name given above. Radiating from the center, the short, stout, dichotomous branches, with broad rounded axils and broad, blunt tips (pl. 25, figs. 1 and 2) counterfeit the hapteres of such a kelp as *Egregia Menziesii* or *E. laevigata* most exactly. The texture is firm and the color, when young, a light yellow brown, darkening with age or on drying. The inner structure is parenchymatous and very much like that of *Ralfsia deusta.* The rows of cells, as seen in section, curve from a middle plane towards each surface (pl. 25, fig. 3). The meristematic region for increase in length is broad and situated at the ends of the branches. The sori, containing the sporangia, are broad and make no visible sign of their presence. They consist of pear-shaped unilocular sporangia which are borne on the same basal cells with the multicellular paraphyses which far overtop them (pl. 25, fig. 4). At first the sorus is covered by the cuticula, but this is soon sloughed and the paraphyses are uncovered (pl. 25, fig. 3.) No sign of gametangia (plurilocular sporangia) has been seen in any of the specimens

examined. The plants are only loosely attached to the substratum and the branches are channeled below (pl. 25, fig. 2).

The genus *Hapterophycus* must belong in either the Ralfsiaceae or the Chordariaceae, as at present understood. Perhaps these two orders should be united. If kept separate, the affinities of *Hapterophycus* seem clearly with the Ralfsiaceae, differing only from the genera now included in that order by the branches being free instead of completely (or nearly completely) coalescent. In fact, *H. canaliculatus* has many points in common with *Ralfsia deusta,* whose loose attachment to the substratum and imbricated and often deeply lobed margins seem to connect the genus *Ralfsia* with *Hapterophycus.* There is a certain superficial resemblance between *H. canaliculatus* and *Cylindrocarpus Berkeleyi,* but the microscopic structure of the two species is quite different. *Hapterophycus* has also some considerable resemblance to the basal portions of *Analipus* and *Caepidium,* but is certainly not identical with either of those genera.

Callymenia oblongifructa comb. nov.

Iridaea oblongifructa Setchell. Notes on Algae I., Zoe, vol. 5, p. 123, 1901; Setchell & Gardner, Algae Northwestern America, p. 300, 1903.

When in 1901 I described a plant sent by N. L. Gardner from Whidbey Island, Washington, as *Iridaea oblongifructa,* I relied upon the habit and the internal structure to refer it to the genus *Iridaea.* The cystocarp also seemed more diffuse, like that of *Iridaea* rather than of *Callymenia.* I did not, at that time, observe the procarps, nor did I find the tetrasporangia. In 1903 Gardner and myself, in publishing our "Algae of Northwestern America," expressed the opinion that it might be a species of *Callymenia.*

Since then, I have been able to examine other specimens and to make further studies, with the result that I am certain that the species must be removed from *Iridaea* into *Callymenia,* where it forms a distinct species.

Callymenia oblongifructa, even yet, is a very little known plant. It is usually obtained in fragments, often of large size, but still incomplete. Young plants, seemingly of this species,

have been collected, but, since they are sterile and much thinner than the adult type, their identification is not so certain as could be desired.

In general, it seems certain that *C. oblongifructa* has the habit and appearance of a species of *Schizymenia* or of *Dilsea*. Arising from a broad fleshy disk, the plant soon broadens to ovâte or even to cordate, and then grows on into a frond which is much longer than it is broad. It certainly reaches a length of 75 centimeters and a breadth of at least 30 centimeters. As the plants giving these measurements were fragments of a larger plant, it seems equally certain that plants must exist with measurements even considerably greater than these. At first the frond is undivided, but later splits to the very base.

The texture is firm and membranaceous when dry, becoming more or less fleshy when the dried plant is soaked in fresh water. Some individuals deliquesce more or less completely after a time in the "soaking out" process, but others remain intact. The color varies from dark red to light red, but the latter color seems to belong particularly to "weathered" specimens. The surface is very delicately marked by coarse but very slightly elevated wrinkles running out flabellately from the base. This character of the surface, while slight and often obscure, often serves to identify a sterile specimen. The thickness of the adult frond varies in the same frond from about 210μ to 550μ, but large specimens, which are however still young, are often not over 150μ or 200μ in thickness. On account of the delicate wrinkling, the thickness varies considerably in the same frond and within short distances.

The internal structure has a certain fairly close resemblance to that of true species of *Iridaea*. It varies somewhat, according to age and condition, and such variation may be found even in the same frond. The general course of the slender (or, at times, coarser) filaments of the medulla is longitudinal, but there are oblique cross connections at frequent intervals making more of a reticulum, or at least a looser one, than is usual in species of *Callymenia*. The cortex on each side is thin, as compared with the medulla. It consists of about five layers of cells loosely but regularly placed in the surrounding jelly, and decreasing in size,

while increasing in color, as they approach the surface. A fairly thick and transparent cuticula clothes the surface.

The cystocarps are broad and deep-red, a very little, and equally, prominent on both surfaces. The "nuclei" or spore clusters are small and well separated from one another. Procarpic branches are fairly abundant and easily detected. In addition to the procarp, they consist of about five cells much elongated laterally and of the general character of those of *Callophyllis* (cf. Hauptfleisch in Engler & Prantl, *Die natürl. Pflfam.*, 1 Th., Abth 2, fig. 220D, 1896) and of *Erythrophyllum* (cf. Twiss, *Univ. Calif. Publ.* Bot., vol. 4, pl. 24, fig. 11, 1911). The structure of the procarpic branch assists very materially in deciding the position as between *Iridaea* and *Callymenia.*

The tetrasporangia are scattered through the cortex and occur in plants somewhat thinner (400–420μ thick) on the average than the cystocarpic plants. They are oblong, 18–21μ high by 14–16μ broad, and are divided in the tripartite-cruciate fashion.

C. oblongifructa differs from all the other species of *Callymenia* known from our western coasts in habit, color, thickness, and details of internal structure. It belongs to the section of the genus, to which J. G. Agardh (*Anal. Alg.*, p. 65, 1892) assigned the name *Euhymenia,* so far as internal structure is concerned and the position and influence of the cystocarp on the frond is concerned. It differs sufficiently from all the species of that section, however, in its simple habit to render farther comparison unnecessary.

C. oblongifructa has been found on the shores of Whidbey and San Juan Islands in the State of Washington as well as near Sitka, Alaska, by N. L. Gardner, and near Seldovia, Alaska, by C. V. Piper.

Besa gen nov. Gigartinacearum

Frons epiphytica (aut hemiparasitica), elongato-papillaeformis aut clavata, simplex aut parce lobata, laete rubra, cystocarpiis adultis frondem fere complentibus, nucleis distinctis multis per cellulis sterilibus magnis segregatis compositis, carpostomio proprio nullo; antheridiis tetrasporangiisque adhuc ignotis.

B. papillaeformis sp. nov.

Frondibus gregariis aut sparsis, 0.28–0.48 mm. altis et ad 0.38 mm. latis, carnoso-cartilagineis et in frondibus crustaceis rubris Hildenbrandtiae(?) epiphyticis (aut hemiparasiticis).

In zona litorali, apud San Francisco, in ditione Californiensi, ubi detexit W. A. Setchell.

It has seemed best to name this extremely minute plant after the Egyptian god Bes, whose Greek name Βῆσα has been adopted into Latin unchanged. He is always represented as a dwarf and extremely small even at that.

I first detected this plant growing in small groups on a crustaceous red alga, probably a species of *Hildenbrandtia,* which covered the rocks in the upper middle litoral zone at the locality known as Land's End, at the northern extremity of San Francisco, California, in January, 1909. Its color is very slightly lighter than that of the *Hildenbrandtia* on which it is growing and it is due to this fact that it attracted my attention.

The fronds are simple and clavate or somewhat compound, being more or less deeply lobed as shown in plate 25, figure 5. They do not reach a height of much over half a millimeter at most. They are attached to the substratum by a broad base (pl. 25, fig. 6), whose basal cells have protoplasmic connection with the cells of the host plant. The development of *Besa papillaeformis* begins, and progresses for a short time, under the cuticula of the host, at length breaking through. The cuticula of the host may be seen in sections of the adult specimens still covering the bases at the sides (pl. 25, fig. 6). It is this behavior of the plant in breaking through the cuticula, as well as the difference in the consistency and cell structure of the papilliform body, which leads me to regard it as a hemiparasite and not as the fruiting body of the crustaceous red alga upon which I have always found it growing. This crustaceous red alga seems, from its structure, to be a species of *Hildenbrandtia,* but I have not been able as yet to find any fruiting bodies of any sort upon it.

The young and sterile plants are slender and cylindrical or clavate, while the cystocarpic plants are swollen above and come to be obovate. In the older plants, the central cells are elongated and the central strands become almost filamentous.

Procarps are very abundant in plants of the proper stages of which I have observed a few. They are simple, curved, of about three cells ending in a long trichogyne. The basal cell probably functions as an auxiliary cell, but the details of development have not been traced.

The cystocarps are large for the size of the plants and come to occupy the greater part of it. They are the typical "compound cystocarps" of the Gigartinaceae and are well represented in figure 6 of plate 25. The various spore masses are separated from one another by large sterile cells and there is no distinctly marked-off and special enveloping tissue. The whole structure of the plant, of the cystocarp, and of the procarp, indicate that *Besa papillaeformis* is to be placed in Gigartinaceae, under the family Gigartineae, and near the genus *Gigartina* itself.

There is a certain resemblance in habit (taking plant and host together) to *Dermocorynus Montagnei* Crouan, but the resemblance apparently stops there, since that species is described as having the structure of frond and cystocarp of the Grateloupiaceae.

Thus far I have detected *Besa papillaeformis* only at the single locality mentioned above, but I have collected it there on several different occasions. It will probably be found in other similar situations on the coast of middle California at least, escaping notice on account of its microscopic size.

Fauchea laciniata forma **pygmaea** Setchell et Gardner, forma nova

F. laciniata forma colore et structura frondis cystocarpiorumque ut in planta typica sed frondibus pygmaeis, 1–3 cm. altis, rosulatis, compactis, et condensatis; cystocarpiis numerosissimis, in paginis utrisque aggregatis; nematheciis efformatis, latis.

In corallinaceis articulatis, in zona litorali inferiore apud "San Pedro," in ditione Californiensi, ubi detexit N. L. Gardner.

It seems proper to call attention to, and to bestow a name upon a set of plants which seem clearly to belong to *Fauchea laciniata,* but which possess a particular and distinctive habit due apparently to their environment. These plants are very

much dwarfed and compacted into rosulate tufts. The thallus is condensed, so that the branches are shorter and the whole habit more compact. There seems to be no particular distortion, and the microscopic structure seems entirely normal. The dwarf plants show abundant cystocarps, which are coronate and very thickly placed on both surfaces. I have seen only a few tetrasporic plants. They are small (about 1 cm. high) and the nemathecia resemble those first formed in typical *F. laciniata,* being broad patches but without any regular or fixed outline or arrangement.

The f. *pygmaea* grows chiefly on jointed corallines which form a zone at the lower tide mark or just below. They have other dwarf (or dwarfed) forms on them and are accompanied by pigmies of other algae as well, thus making a characteristic formation. The *Fauchea(?) mollis* Howe alluded to below may possibly belong to this form, although its being sterile seems to indicate, rather, that it may more likely prove to be a juvenile state of *F. lacinata.*

Fauchea Fryeana sp. nov.

F. fronde solitaria (aut caespitosa?), usque ad 34 cm. diam., in circumscriptione late aut moderate reniformi, vinoso-rubra, cartilagineo-membranacea, e disco radicali; stipite brevi, ad 12 mm. alta; fronde ampla, flabellatim expansa, e basi et superne repetite dichotomo-dissecta; segmentis inferne lente attenuatis, inferioribus latioribus, superioribus angustioribus, ultimis numerosissimis, acutis, lateraliter grosse dentatisque; fronde 100–360μ crassa, stratis tribus composita,—strato medullari cellulis magnis in centro extus parvioribus, stratis corticalibus duobus. cellulis, parvis, elongatis, coloratisque, sphericis, in seriebus anticlinis moniliformibusque dispositis; tetrasporangiis in nematheciis indefinitis sed elongatis flabellatim radiantibusque, in partibus inferioribus, triangulo divisis, paraphysibus multicellularibus superantibusque comitatis, omnibus in gelina crassa hyalinaque involutis; antheridiis adhuc ignotis; cystocarpiis margines segmentorum omnium majorum occupantibus, dense confertis, urceolatis, apice quoque in collo longo attenuato, intus placentis basilaribus nucleos sporarum conglobatarum gerentibus, pericarpiis intus filamentis late reticulatis compositis, peristomiis latis.

In zona sublitorali, "Friday Harbor" et vicinis, in ditione Washingtoniensi, ubi detexerunt Prof. T. C. Frye et Dr. N. L. Gardner.

There are already two species of this genus known from the same general region as the one described, viz., *Fauchea laciniata* J. Ag. and *F. Gardneri* Setchell. *F. Fryeana* differs from both of these in both the cystocarpic and the tetrasporic plants. *F. laciniata* belongs to the section of the genus having coronate cystocarps. They are also scattered over both surfaces of the frond. The nemathecia in *F. laciniata* are also different, at least in general aspect, from those of *F. Fryeana* (cf. Setchell & Gardner, *Algae of Northwestern America,* pl. 19, fig. 30, 1903). The type of *F. laciniata* in Herb. J. Agardh, at Lund, is from Santa Barbara. It is cystocarpic and the cystocarpic specimens from Puget Sound have been compared with it and agree closely. *F. Gardneri* has cystocarps which lack a corona, but they are also scattered over both surfaces of the frond. The nemathecia of *F. Gardneri* are small and irregular in shape and scattered over both surfaces in a grapheiform fashion (cf. Setchell & Gardner, *loc. cit.,* pl. 25, fig. 43). The cystocarps of *F. Fryeana* are strictly marginal and so closely placed that they give the margins a decidedly fimbriate appearance (cf. fig. 13, pl. 31). They are sometimes, also, situated in short and slender process projecting a few millimeters from the margin in older (or at least larger) plants, and when this condition is present it heightens the fimbriate appearance.

Howe (*Bull. Torrey Botan. Club,* vol. 38, p. 506, pl. 31, 1911) has just described a new species of *Fauchea,* under the name of *F. Sefferi,* which has marginal cystocarps which are not coronate, and this species is to be most seriously considered in comparison. It is very much narrower than any specimens of *F. Fryeana* seen among our specimens, is of entirely different aspect, and is more striking in its dichotomy, characters which, from the study of a considerable variety of *Fauchea* material, appeals to me as being reasonably constant. Unfortunately, Howe did not have any tetrasporic plants of his species, so that full comparison cannot be made. This is to be regretted, since, in our Pacific Coast species, the character of the nemathecia assist greatly in identification. It seems, however, perfectly safe to consider our plant as being quite distinct from the *F. Sefferi* of California Baja.

Young and tetrasporic plants of both *F. laciniata* and *F. Gardneri* are broader, thinner, brighter or deeper colored than older and cystocarpic plants. The tetrasporic plants of *F. Fryeana* (cf. fig. 14, pl. 31) are mostly very young or, even the oldest of them, not very old. They resemble in habit and characters of thickness the *Fauchea(?) mollis,* described from young, sterile specimens by Howe (*loc. cit.,* p. 507, pl. 32; pl. 33, fig. 6). The young plants of *F. laciniata* also resemble in habit characters *F.(?) mollis.* It will be impossible to determine definitely just what *F.(?) mollis* really is until it has been traced into its adult forms. If it should happen that *F.(?) mollis* prove to be identical with any one of the three species of the coast of the United States, it seems not unlikely, since several of the species described by Howe from La Paz are found also on our Southern California coast, that it may prove to be a young plant of *F. laciniata,* whose type locality is Santa Barbara, California, rather than either one of the other two, which, thus far at least, have been found only in the colder waters of Puget Sound. In thickness and structure of the frond, young plants of *Fauchea laciniata* agree exactly with the descriptions of *F.(?) mollis,* while young plants of *F. Fryeana* differ only in the more distinctly anticlinal rows of the cortex. In structure and habit, young plants of *F. Gardneri* are decidedly different from *F.(?) mollis.*

It seems best, after due consideration, to propose *Fauchea Fryeana* as a new species, as was done by letter some several years since, and to name it in honor of Professor T. C. Frye of the University of Washington, who sent me the first specimens. The types are deposited in the Herbarium of the University of California and the type locality is Friday Harbor, Washington, whence also have come fine typical specimens of *F. Gardneri* and of *F. laciniata.*

Dudresnaya caribaea (J. Ag.) comb. nov.

Calosiphonia caribaea J. G. Agardh, Analecta Algologica, cont. v, p. 84, 1899.

In working over some very interesting red algae, found floating in abundance at Coopers Island in the Bermuda Islands, by W. G. Farlow, in 1881, I found three species, two of *Dudresnaya*

and one of *Calosiphonia,* which had so general a resemblance in habit and color to one another that it was difficult to be certain, at least at first, that they could be distinct species. The microscopic structure, especially of the cystocarps and procarps, however, is sufficiently, in fact amply, distinct. A comparison with types and careful study has enabled me to enumerate and describe them in this paper with some considerable degree of confidence as to accuracy.

One of the plants corresponds exactly to the type specimen of J. G. Agardh's *Calosiphonia caribaea,* but is referable to the genus *Dudresnaya,* as indicated above.

Dudresnaya caribaea (J. Ag.) has solitary (or possibly slightly aggregated?) fronds, of a light or yellowish red color and broadly flattened ovate outline. From the discoid (or possibly expanded?) base arises a single stem which, usually, at any rate, soon loses itself in several main branches. The branches are more or less strongly complanate and pinnately distichous (or at times more or less secund); the branches themselves, being branched in turn, conformably twice (or rarely thrice) more. All the branches and branchlets taper towards each end, the ultimate branchlets being fusiform (Pl. 26, fig. 7). The structure of the frond is almost exactly that of *Dudresnaya purpurifera* J. Ag. The peripheral filaments are strongly moniliform, the cells being oblong or obovate and deeply constricted at the nodes, di- to trichotomous below but only dichotomous above. I have not been able to detect tetrasporangia on any of the available specimens, and the species seems to be partially dioecious. Some specimens are smaller and paler, and have the peripheral cells over considerable areas, pale and rounded, as well as apparently discharging their contents. However, it is not certainly to be determined from dried specimens. Other specimens appear to have both antheridia and procarps on the same plant.

The procarps and auxiliarly branchlets closely resemble those of *Dudresnaya purpurifera* J. Ag. Both sorts of branchlets are strongly curved, situated in the outer third of the verticil, and consisting of nine to fourteen cells. In the procarpic branch, the cells are discoid supporting a conical carpogonium which, in turn, is prolonged above into a moderately long, more or less spirally

twisted, slender trichogyne. The auxiliary branches appear to be much more numerous than the procarpic, which they resemble closely, except that the terminal cell is enlarged into a nearly spherical auxiliary cell. The cystocarps are moderate sized, from 45–90μ in diameter, consisting of few spores, successively formed and closely crowded together.

Dudresnaya caribaea is closely allied to *D. purpurifera,* but is to be distinguished from it by its complanate frond, its much more distichous method of branching, and its rather larger, fewer spored cystocarp.

In Herb. J. G. Agardh, there are two specimens under the name of "*Calosiphonia caribaea* J. Ag.," under nos. 34781 and 34782, both marked also "ex Florida Curtiss." No. 34781 is marked "24" and "Tortugas" in pencil, and no. 34782 is marked "30" in pencil. Both plants are cystocarpic. The "Tortugas," then, off the Florida coast are the type locality. It is rather more than possible, in fact it is fairly certain, that the plants were collected by Mrs. G. A. Hall and only transmitted to Professor Agardh by Mrs. Curtiss. Through the kindness of Professor Svante Murbeck and Dr. Otto Nordstedt I was allowed to make a microscopic examination, with the result that I found both types to belong to the genus *Dudresnaya.* This came as a surprise, since there is a species of *Calosiphonia* from the Tortugas, sent by Mrs. Hall, resembling in habit the present plant, and which appears in Herb. J. Agardh as the type of *Helminthiopsis verticillifera* J. Ag., as will be noted below. The suggestion is natural that the type specimens of these two species may have been transposed by Agardh. However, there are certain indications in Agardh's descriptions that he had correctly labelled his types and that his *Calosiphonia caribaea* is designated as he desired it to be. Particularly his description of the curved moniliform filament from which the cystocarp is produced serves to fix it, as well as his remarks noting its resemblance to the plant which he had long kept in his herbarium under the name of *Dudresnaya australis,* of which I shall give farther information later on in this paper.

Dudresnaya bermudensis sp. nov.

D. fronde solitaria (aut pauciaggregata), ad 9 cm. alta, ovata in circumscriptione, dilute rosea, gelatinosa; basi discoidea (aut prostrata extensaque?); axe percurrente sed ramis multis et superantibus, lente valdeve complanata, ramosa; ramis plus minusve distiche pinnatis aut secundis, compressa, ipsis 2–3-plo ramuliferis omnibus utrinque lente attenuatis; ramellis peripheralibus intus cylindraceis, extus moniliformibus; tetrasporangiis adhuc ignotis; monoica?, antheridiis(?) parvis, superficialibus, pallidis rotundisque; ramellis procarpiiferis elongatis, multicellularibus, plus minusve curvatis, cellulis discoideis et cellula carpogoniali apicali obtusa conica in trichogynum elongatum spiraliter curvatum desinente compositis; ramellis auxiliaribus elongatis, multicellularibus, simplicibus aut infra 2–3-ramelluliferis, curvatis, cellulis mediis depresso-sphericis, tumefacientibus, similibus; cystocarpiis moderate magnis, 112–126μ latis, reniformibus, integris aut obscure lobatis, pedicellis curvatis suffultis, maturitate non apiculatis.

Rejecta ab undis ad insulam "Coopers," in insulis Bermudensibus, ubi detexit cel. W. G. Farlow, in anno 1881.

The new species here proposed is one of the rich finds made in 1881 by Professor Farlow at Coopers Island, one of the Bermudas. It is of a delicate pink, soft gelatinous, and (so far as available specimens are concerned) of moderate size. In habit (pl. 27, fig. 8) and color, it approximates somewhat to *Dudresnaya caribaea,* but its procarpic and auxiliary branchlets are of the "Coccineae" rather than of the "Purpuriferae." It also has something of the appearance of *D. coccinea,* but is more complanate and distichous. It has also the moniliform peripheral ramelli of *D. purpurifera* rather than the cylindrical ramelli of *D. coccinea.* From *D. crassa,* it differs decidedly in its habit, moniliform peripheral ramelli, and the absence of a single specialized (smaller) auxiliary cell in each auxiliary branchlet. From *D. japonica* it differs abundantly in habit and also very much in the character of the peripheral and auxiliary branchlets, while from the next species *(D. australis)* it differs somewhat in habit and in details of structure of both the peripheral and auxiliary branchlets. It seems to be a distinct species of the *Dudresnayae Coccineae,* and its chief interest lies in the fact that it combines the auxiliary branchlets of the *D. coccinea*-type with the peripheral branchlets of the *D. purpurifera*-type, a fact pointed

out by Dr. Bornet in a letter to Professor Farlow many years ago. It is also of interest that it occurs in the same restricted locality with *D. crassa* and *D. caribaea.*

Dudresnaya australis J. Ag. sp. ined.

J. G. Agardh in J. Bracebridge Wilson, Catalogue of Algae collected at or near Port Phillip Heads and Western Port (Proc. Roy. Soc. Victoria, new ser., vol. 4, part 2, p. 181, Nov., 1892) nomen nudum; Anal. Alg., cont. v, p. 85, 1899 (cum descr. incompl.)

D. fronde solitaria (aut pauci-aggregata), ad 13 cm. alta, late pyramidali in circumscriptione, rosea, gelatinosa, monoica; basi discoidea (aut prostrata extensaque?); axe percurrente, gracili, tereti; ramis numerosis, quoqueversum exeuntibus, pinnatis, longis, gracilibus, patentibus, utrinque lente attenuatis, ipsis 2–3-plo ramellois, ultimis subulatis; ramellis peripheralibus conformibus, gracilibus, filiformibus, dichotomis, cellulis elongatis compositis; tetrasporangiis zonatis; ramellis auxiliaribus elongatis, cellulis mediis numero 15 proxime, tumefacientibus sed una media conspicue ut cellula auxiliari differentiata, superne ramellosis et deciduis; cystocarpiis, 60–75μ latis, reniformibus, non apiculatis.

Apud Capita Portus Phillipi et apud Portum Occidentalem in Australia, ubi detexit J. Bracebridge Wilson.

While attempting to make a critical study of the Dumontiaceae, my attention was drawn to four magnificent specimens in the Cryptogamic Herbarium of the British Museum of Natural History, belonging to the collection of J. Bracebridge Wilson, and labelled *Dudresnaya australis* J. Ag. Since J. G. Agardh had not published any description of the plant and since no true *Dudresnaya*—in fact, only one other member of the Dumontiaceae, even—was known from the Southern Hemisphere, I took up the study of Wilson's specimen with great interest..

I found that the name, and that only, had been published by Wilson in his Catalogue of Algae collected at or near Port Phillip Heads and Western Port in 1892. I also found the brief mention of the plant, made by J. G. Agardh himself, in the Continuatio V of the *Analecta Algologica* (pp. 84 and 85). Through the courtesy of Mr. A. Gepp, in charge of the cryptogamic collection of the British Museum of Natural History, I was enabled to make a study of the specimens, and later, through

the courtesy of Professor Svante Murbeck and Dr. Otto Nordstedt, to compare them with the specimens in Herb. J. Agardh at Lund. The latter are three in number and correspond exactly to the specimens in the British Museum of Natural History. The Lund specimens are labelled "*Dudresnaya australis* J. Ag. *ad interim*" in J. G. Agardh's handwriting, together with notes on specimens 34730 and 34731, to the effect that J. G. Agardh had observed in these specimens the same sort of procarpic and auxiliary branchlets described by Bornet and Thuret for *Dudresnaya coccinea.* His note in the *Analecta* also makes it plain that he clearly recognized the plant as a *Dudresnaya,* but was doubtful as to its being distinct from the European *D. coccinea.*

The habit of the plant is very similar to that of *Dudresnaya coccinea.* A glance at the accompanying photograph (pl. 26, fig. 9), which was made from one of the specimens in the British Museum of Natural History through the kindness of Mr. Gepp, will show this. The structure both of the peripheral and the auxiliary filaments, however, is not that of *D. coccinea,* but very much like that of *D. crassa* as illustrated by Howe and as shown in specimens distributed by him, especially in specimens preserved in formalin, for which I am very much indebted to his kindness. The peripheral filaments are longer than those of *D. coccinea* and the auxiliary branches differ in several respects. In the first place they are very long, apparently much longer than either those of *D. coccinea* or of *D. crassa.* At the base there is a long cylindrical portion, then in the middle about fifteen swollen cells, one of which is wider and more flattened than the others, functioning as the auxiliary cell, and above this a long and generally two or three times dichotomous sterile portion. This terminal sterile portion seems to drop off, or separate, about, or possibly even before, conjugation. *Dudresnaya australis* is plainly monoecious, the antheridia being very similar to those of *D. coccinea* as figured in Bornet and Thuret's *Notes Algologiques* (pl. xi, fig. 2).

Both tetrasporic and cystocarpic plants are represented among the plants at Lund and at London. The tetrasporangia are zonate, as are those of *D. coccinea,* the only other species of the genus in which they have as yet been found.

It is with some hesitation that I take this name of J. G. Agardh and publish it after his death. He had evidently refrained from publishing it, but I think that, had he been able to go over the recent additions to the genus and to have compared the various species that we now know, his judgment would have been to publish his *D. australis*. In examining the Schmitz collection of slides in the British Museum of Natural History, I find two of *D. australis*, but Schmitz made no mention of this species of the Southern Hemisphere in his account of *Dudresnaya* in the *Pflanzenfamilien*.

Calosiphonia verticillifera (J. Ag.) comb. nov.

Helminthiopsis verticillifera J. G. Agardh, Analecta Algologica, cont. v, p. 98, 1899.

Plant single, or few together, from a discoid(?) base, rising up to 25 or 30 cm. in height, bushy, more or less broadly pyramidal in general outline, rose red, moderately gelatinous, with occasionally small and scattered deposits of lime; main axis more or less distinct, at times becoming indistinct above or losing itself in several main branches, slightly above the base, all of which are nearly equal in growth; axis and main branches slightly to strongly flattened below and distichously pinnately branched from the margins in the lower part, but becoming polystichous above, especially near the tips; branches of three to four orders, slightly attenuated towards each end, those of the last order fusiform; tetrasporangia unknown as yet; antheridia and cystocarps apparently on different plants; antheridia scattered over the entire surface of the antheridial plant which is paler in color than the cystocarpic; cystocarps minute, 35–45μ in diameter, ellipsoidal, of few (12–15) spores, embedded in a transparent jelly which extends out on all sides beyond the spores, with a short cylindrical cell as a pedicel, loosely and irregularly scattered through the inner cortex, each beneath a minute carpostome.

Tortugas, *Mrs. Curtiss!;* Coopers Island, Bermuda, *W. G. Farlow!*.

The *Helminthiopsis verticillifera* of J. G. Agardh is one of the most beautiful of the Red Algae, and as J. G. Agardh says

(*loc. cit.*), it resembles in color and general appearance some of the forms of *Halymenia Floresia* (pl. 28, fig. 10). In structure, however, it is entirely different. The frond develops from a nearly hemispherical apical cell, from which cells are cut off by successive horizontal partitions. Vertically oblique walls, in turn, cut off four lateral cells from one of the subapical cells, and these in turn develop into a whorl of four ramelli, 3–4-chotomous below and dichotomous above. The resulting plant has a monosiphonous axis giving off successive whorls of ramelli whose ultimate segments combine to form a sort of cortex. The structure is very similar to that of *Calosiphonia Finisterrae* as represented by Bornet and Thuret in the *Notes Algologiques* (cf. pl. xii, figs. 1–3).

What seem to be antheridial plants differ from the cystocarpic only in being lighter colored. The antheridia are scattered more or less, uniformly over the surface, being borne singly or in pairs at the tips of the peripheral filaments. The antheridia are nearly globular and colorless.

The procarps and auxiliary cells were not seen. The cystocarps occur irregularly scattered and just under the periphery. They are very small and ellipsoidal and surrounding a thick layer of transparent jelly. Each cystocarp is supported on a short cylindrical cell and lies in a pear-shaped cavity which opens outward through the cortex by a small pore.

The type of the genus *Helminthiopsis,* as distinctly stated by J. G. Agardh, is *H. verticillifera.* But this species seems to fulfill all the proper requirements to be admitted to the genus *Calosiphonia.* If this view is correct, as it seems to me to be, the genus *Helminthiopsis* falls and is to be deleted. However, J. G. Agardh described a second species (*loc. cit.,* p. 98), founded upon an Australian plant, which he named *H.(?) rosea.*

The type of *H.(?)* rosea is a single specimen, no. 31989 of Herb. J. Agardh at Lund. It was collected at Port Phillip Heads, Victoria, Australia, by J. Bracebridge Wilson on January 23, 1886. It is extraordinarily unlike *H. verticillifera,* both in habit and structure. It is a very small plant of a rosy red color, having a central strand of slender vertical filaments which give off horizontal moniliform ramelli. The cystocarps are small

with a circle of overarching bracteoid filaments. I have not made a sufficiently careful study to speak with certainty, but it seemed to me, while examining it, to be a species of *Helminthocladia,* in all probability.

BAYLESIA, gen. nov. Dumontiacearum

Frons anceps, e disco radicali erecta; axe principali elongata, pauciramosa, ramis elongatis, axe ramisque pinnis brevibus distiche et conferte ramulosis plumosis vestientibus; axe principali, ramis, ramulisque a cellula apicali orientibus e qua axibus monosiphoneis, ramellis peripheralibus verticilliter positis, et filamentis descendentibus orientibus; tetrasporangiis antheridiisque adhuc ignotis; procarpiis et cellulis auxiliaribus in ramellis propriis curvatisque positis; cystocarpiis reniformibus, integris aut lente sublobatis, pedicellis curvatis suffultis.

Genus ad Pikeam vergens, sed per ramulos fertiles non tumefacientes distinguendum et in honorem Dominarum Bayles nominatum.

B. plumosa, sp. nov.

B. fronde solitaria(?), e disco radicali, ancipite, elongata, vinoso-rubra, erecta, ad 60 cm. alta, parce ramosa, ubique distiche pinnato-plumosa, ramis paucis elongatis, conformibus, ramulis plumosis, numerosis margines axis ramorumque dense vestientibus, ipsis curtis dense et distiche ramulosis; cystocarpiis in ramulis non tumefacientibus.

Infrequens,, rejecta ab undis, prope "Monterey" in ditione Californiensi, ubi detexerunt Dominae A. et A. Bayles, Domina J. M. Weeks, Doctor C. L. Anderson, et W. A. Setchell.

For many years there has been great confusion in the plants placed under the name of *Pikea californica* Harv.,—in fact, Harvey himself founded the species upon two different plants at least. One, however, seems to stand out as the type and that is the plant distributed under no. 897 of the *Phycotheca Boreali-Americana.* Harvey, however, evidently founded his species partly on the plant we now call *Farlowia mollis. Pikea pinnata* has also been confused under *P. californica* as have been several other plants, one of which is the plant just described.

Baylesia plumosa seems to be a rare plant, having been found only a few times and then only cast up by the waves. It has been detected thus far only on the shores of Monterey Bay, or immediate vicinity. The attachment is wanting in all but one

of the specimens I have seen. *Baylesia* is to be distinguished from all the Dumontiaceae closely related to *Pikea,* by the extreme differentiation between the long and the short axes, which gives the plant its particularly plumose appearance. This serves to distinguish it from *Leptocladia* J. Ag. (= *Andersoniella* Schmitz) and *Farlowia,* while from *Pikea* itself it is to be farther separated by the fact that the branchlets containing the cystocarps are not at all swollen. The internal structure resembles that of *Cryptosiphonia* and of *Pikea.* The auxiliary cells are in specialized curved branchlets characteristic of the Dumontiaceae.

I take great pleasure in dedicating the genus created for the reception of this beautiful and rare plant to the Misses A. and A. Bayles of Pacific Grove, California, who have been zealous in their search after rare and beautiful specimens of marine algae and who have always been willing to share with me their choice specimens. I am indebted to them for a fine fruiting specimen of the *Baylesia plumosa.* This is regarded by me as the type and is no. 95043 Herb. University of California. Another specimen (no. 95045 Herb. Univ. Calif.) has been chosen for photographing and representation on plate 29, figure 11, since it is less dense and more suitable for reproduction by photography. I have also been allowed to examine and affix a manuscript name to specimens of *Baylesia plumosa* in Herb. Farlow at Harvard University and in the Herbarium of the New York Botanical Garden. In both cases the specimens were collected on the shores of Monterey Bay, California, by Dr. C. L. Anderson.

Leptocladia Binghamiae J. Ag.

The genus Leptocladia was described by J. G. Agardh in 1892 (*Analecta algologica, Acta. Soc. Physiogr. Lund,* vol. 38, p. 95) from a plant collected at Santa Barbara, California, presumably by Mrs. Bingham. The type and only species, viz., *Leptocladia Binghamiae* J. Ag., is represented by two fragments in Herb. J. G. Agardh at Lund, preserved under no. 28231. They are both cystocarpic. Although neither specimen is in any fashion complete, yet they are both sufficiently perfect and characteristic to be identified with certainty with the plant distributed under no. 700 of the *Phycotheca Boreali-Americana* as *Andersoniella Farlowii* Schmitz.

Leptocladia Binghamiae is well described and in considerable detail by J. G. Agardh, who lays stress upon a number of characteristic points. He was, however, in very considerable doubt as to the systematic position of the plant but placed it for the time being in his Rhodymenieae, comparing it particularly with *Hymenocladia* and *Plocamium.* De Toni (*Syll. Alg.,* iv, 2, p. 609, 1900) places it in the Family Rhodymeniaceae and the Subfamily Plocamieae. Schmitz does not mention the genus at all in his account of the Rhodophyceae in the *Pflanzenfamilien.* From its possession of specialized curved auxiliary ramelli in the fertile portions of the frond, *Leptocladia Binghamiae* seems to belong to the Dumontiaceae, as now limited, and in the immediate vicinity of *Pikea,* under species of which it may, at times, be found in different herbaria. It may be distinguished from species of that genus (as limited by Schmitz) by having the cystocarps scattered through the upper and not specially swollen or otherwise differentiated portions of the fertile plants. There are other characters, viz: the subdichotomous branching, and the details of structure and development of the cystocarp which distinguish it from the species of *Farlowia,* while it is to be readily separated from species of *Cryptosiphonia* by its complanate and distichously subdichotomous frond.

Andersoniella Farlowii Schmitz is briefly described by him in Engler & Prantl's *Pflanzenfamilien* (1 Th., Abth. 2, p. 520, 1897). The type of Schmitz can be located only by inference. It is, I feel certain, represented by four slides in the Schmitz collection at the British Museum of Natural History, numbered 4.86. The slides purport to have been prepared from no. 28 of Farlow, Anderson and Eaton's *Algae Exsiccatae Americae Borealis.* This number was probably supplied by Dr. C. L. Anderson to Grunow, who, in turn, loaned it to Schmitz. No. 28 of the *Alg. Exs. Am. Bor.* is labelled *Farlowia compressa,* but an examination of different copies shows that the specimens were mixed. There were distributed under this number true *Farlowia compressa* (Herb. Farlow!, Herb. Brit. Mus. Nat. Hist.!, Herb. Univ. Calif.!) and undoubtedly this number was based on the proper plant, but *Andersoniella Farlowii* was also distributed (Herb. N. Y. Bot. Garden!) as well as an undescribed species of

Leptocladia (to be named *L. conferta* below) in one copy (Ex Herb. Asa Gray in Crypt. Herb. Harvard Univ.!). It seems perfectly possible, then, that *Andersoniella Farlowii* may be found in other regularly issued copies of this distribution. Dr. Anderson also distributed duplicates from his collection with the printed labels of the *Alg. Exs. Am. Bor.*, and this has been a source of confusion in the case of certain numbers.

The four slides in the Schmitz collection, prepared from no. 28 of the *Alg. Exs. Am. Bor.*, represent the plant distributed under no. 700 of the *Phycotheca Boreali-Americana* mentioned above as being the *Leptocladia Binghamiae* of J. G. Agardh. They are not labelled *Andersoniella* by Schmitz, but *"Farlowiella."* They agree, however, with Schmitz's description of his *Andersoniella Farlowii* and it seems extremely probable that Schmitz, finding *Farlowiella* preoccupied, changed the name in his manuscript, without changing the designation on his slides.

The name for the Californian plant must be *Leptocladia Binghamiae* J. Ag., and it seems as certain as may be made possible that the later *Andersoniella Farlowii* Schmitz is the same plant. It is not uncommon on the coast of Southern California (San Diego, *Mrs. M. S. Snyder!, Will S. Wright!, H. Hemphill!, Miss Minnie Reed!;* San Pedro, *A. J. McClatchie!, Mrs. S. C. Purdy!, W. A. Setchell!;* Ventura, *Mr. Tenney!;* Santa Barbara, *Mrs. Bingham, Dr. and Mrs. L. N. Dimmick!*) ; and it extends up to Santa Cruz (*Dr. C. L. Anderson!, Dr. W. G. Farlow!*). Both cystocarpic and tetrasporic plants have been found.

Leptocladia conferta sp. nov.

L. fronde gregaria, erecta, e disco radicali, 15–20 cm. alta, atro-rubra, cartilaginea, angusta, complanata, crassa, subdichotomo—ramosa, ramis elongatis ubique ramulis proliferis confertis et fasciculatis apud margines obsitis, obsolete serratis fimbriatisque; strato medullari filamentum monosiphonium crassumque centrale et filamenta descendentia tenuiaque numerosissima ostendente strato corticali filamenta radiantia 2–4-chotomo-ramosa cellularum tenuiorum intus majorum extusque minorum ostendente; tetrasporangiis antheridiisque adhuc ignotis; ramellis auxiliaribus curvatis, e cellulis paucis discoideisque compositis; cystocarpiis immersis, ubique in ramis superioribus non tumefacientibus, reniformibus, profunde paucilobatis, inferne pedicellis curvatis curtisque suppositis; sporis

in filamentis 2–3-chotomo-ramosis, e cellulis basalibus paucis pallidioribusque radiantibus; carpostomio, ut videtur, nullo.

Hab. in saxis apud oras Californienses meridionales.

Under the name proposed above, I have placed plants which I have observed most carefully at a locality locally known as "Dillon's Beach," situated on the coast of California just north of the mouth of Tomales Bay. I have also collected others at Carmel Bay, near Monterey, California. The species has been collected at Santa Cruz (or Pacific Grove?), California, by Dr. C. L. Anderson and appears in some copies of Farlow, Anderson and Eaton's *Algae Exsiccatae Americae Borealis,* as mentioned above. I have also received specimens from as far north on the California coast as Trinidad Head, whence they were sent by Mr. C. M. Drake. Thus far, then, it seems to be a plant of the middle California coast. *Leptocladia conferta* grows in rather bushy tufts which are dark red and rigid, where shallow pools are left by the receding tide in the lower portion of the litoral zone.

One characteristic feature of this species is the abundance of the fasciculate proliferations. I have visited the locality at Dillon's Beach during most of the seasons of the year and have never, as yet, found any really young plants. All seem older and have few to very many of the characteristic proliferations which give the species its bushy appearance. The specimens are fairly constantly cystocarpic and, although I have had the opportunity of examining several hundred plants, I have found no indication of either tetrasporic or antheridial individuals.

Leptocladia conferta has the complanate frond and the subdichotomous normal branching of *L. Binghamiae,* but the frond of the former is narrower and thicker than that of the latter, less prominently serrate, more cartilaginous, and constantly and, as it seems, characteristically beset with the longer or shorter adventitious proliferations. This habit is well shown in figure 12 of plate 30. The microscopic structure of the two species is very similar, as it is also to that of *Pikea,* differing only in minor details. The cystocarps, too, are very similar in the two species, but in *L. Binghamiae* there is a carpostome present, while there does not appear to be such a structure in *L. conferta.* They both

agree, however, in having the cystocarps scattered through the upper, not swollen or otherwise modified, portions of the frond.

Weeksia Fryeana sp. nov.

W. fronde ampla, membranacea, late aut anguste reniformi, integre aut parce lobata laciniatave, 30–35 cm. alta, 15–30 cm. lata, roseo- ad purpureo-rubra, marginibus integris, varie et late lobatis, e disco radicali, ut videtur, emergente, stipite obsoleto; f. stratis tribus contexta, strato medullari lato, filamentis crassis granulatisque intertextis, stratis duobus corticalibus intus cellulis majoribus depresso sphericis hyalinisque, extus cellulis parvis coloratisque in seriebus anticlinis curtisque constitutis et cuticula hyalina indutis; tetrasporangiis in cortice immersis, triangulo-divisis; antheridiis(?) superficialibus, effusis, pallidis, in plantis propriis(?); ramellis procarpiiferis elongatis lente curvatisque serie cellularum basi depresso-sphericarum apice tumidarum et unilaterale elongatarum compositis, cellula apicali late conica in pilum longum desinente; ramellis auxiliaribus conformibus sed cellula apicali depresso-spherica; cystocarpiis per stratum corticale dispersis, majoribus, rotundatis, pedicellatis filamentis ooblastematicis e cellulis centralibus radiantibus, ramosis, basi decoloratis, apice laete rubris et in sporis catenatis transformatis; carpostomio inconspicuo, sed, ut videtur, adente.

Rejecta ab undis et in aquis 40 m. in profundo, apud insulas dictas "Orcas" et "San Juan," in ditione Washingtoniensi, ubi detexerunt Prof. T. C. Frye et Dr. N. L. Gardner.

In 1904 there was dredged, presumably in twenty fathoms of water, off Newhall, on Orcas Island, Washington, a small specimen which was sent to me for identification by Professor T. C. Frye of the University of Washington. The plant appeared possibly, but not altogether certainly, to be antheridial. Later a much finer and more perfect plant was sent by Professor Frye, collected at Deer Harbor on San Juan Island, in the same State. This plant has cystocarps and thus it is possible to make certain that it is a member of the Dumontiaceae and constitutes a second and a new species of the genus *Weeksia.*

Weeksia Fryeana is a large plant; probably it will be found to be a very large plant for a red alga, and may have been collected previously under the impression that it belonged to *Schizymenia* or to *Sarcophyllis.* It is to be distinguished from all species of the former genus by its cystocarpic structure and

development and from all known species of the latter by its habit, more delicate texture, and certain structural details of the procarps and cystocarps.

Like *Weeksia reticulata, W. Fryeana* is of a fleshy consistency and of a light rosy red color very similar to that of *Callymenia reniformis.* Both species of *Weeksia* have the reniform habit of *Callymenia,* especially in older and characteristic forms. *W. reticulata* proliferates from the margin, the proliferations being in turn Callymenioid, but thus far no such process has been seen in *W. Fryeana.* However, as stated above, only a very few specimens and fragments of *W. Fryeana* have been seen. In neither of the species of *Weeksia* are the surfaces smooth and even, both being indefinitely wavy and uneven. In *W. reticulata,* however, as its name indicates, there is a series of broad but obscure veins radiating from the base and forming a coarse reticulation through the middle region of the frond, and vanishing towards the margins. Nothing like this has been seen in *W. Fryeana.*

The few specimens thus seen have come from Orcas Island (T. C. Frye!, N. L. Gardner!), where they have been obtained from deep water. I have also seen and, through the courtesy of Dr. M. A. Howe, have been able to examine a specimen of very considerable interest in the Herbarium of the New York Botanical Garden. It is a specimen with the label-heading: "Herbarium of the U. S. South Pacific Exploring Expedition under the command of Capt. Wilkes, U. S. N., 1838–1842." It is identified as "*Iridaea Mertensiana,*" and was collected somewhere in "Oregon and Washington Territory." The fragment examined shows young procarps and auxiliary branchlets.

Transmitted January 22, 1912.

EXPLANATION OF PLATES

PLATE 25

Hapterophycus canaliculatus Setchell & Gardner

1. Portion of a thallus seen from the upper side. × 2 diam.

2. Portion of a thallus seen from the lower side. × 2 diam.

3. Vertical section through a lobe of the thallus, showing a portion of a sorus above. × 280 diam.

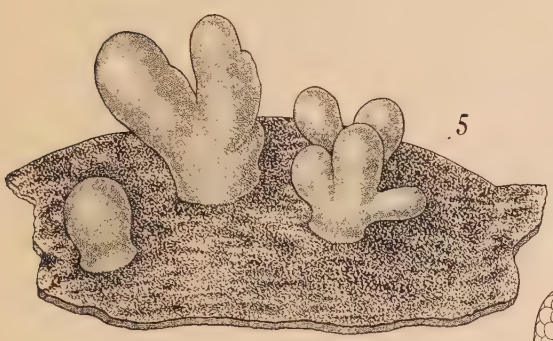
4. Unilocular sporangium and paraphysis. × 920 diam.

Besa papillaeformis Setchell

5. Portion of the crustaceous thallus of the host, bearing four plants of the hemiparasite. × 60 diam.

6. Median vertical section through a cystocarpic plant and a portion of its host. × 240 diam.

Figures 1–4 were drawn under the writer's direction by Miss Anna Hamilton, and figures 5 and 6, by Mr. W. C. Twiss.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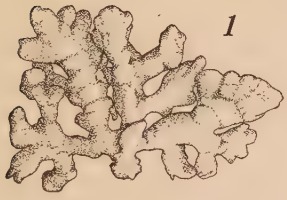
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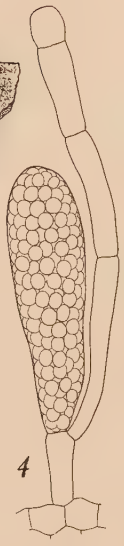
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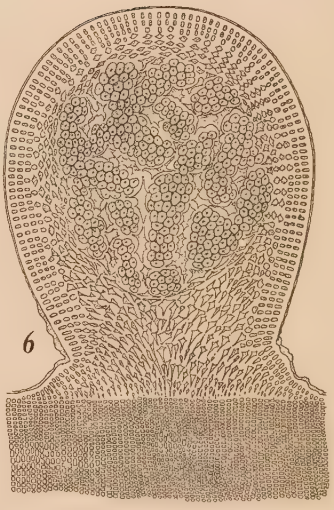
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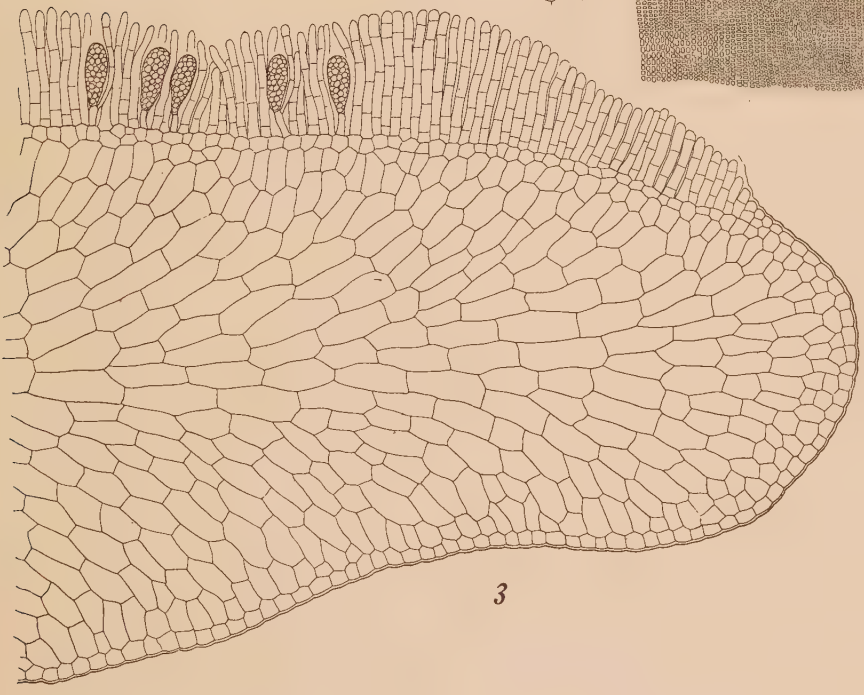
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PLATE 26

Dudresnaya caribaea (J. Ag.) Setchell

8. Habit of the type specimen. × 1 diam.
Photograph, through the kindness of Mr. M. B. Nichols.

PLATE 27

Dudresnaya bermudensis Setchell

8. Habit of the type specimen. × $\frac{13}{18}$ diam.
Photograph, through the kindness of Mr. M. B. Nichols.

Dudresnaya australis J. Ag.

9. Habit of a cotype in the J. Bracebridge Wilson collection in the British Museum of Natural History. × $\frac{125}{157}$ diam.

Photograph, through the courtesy of Mr. A. Gepp.

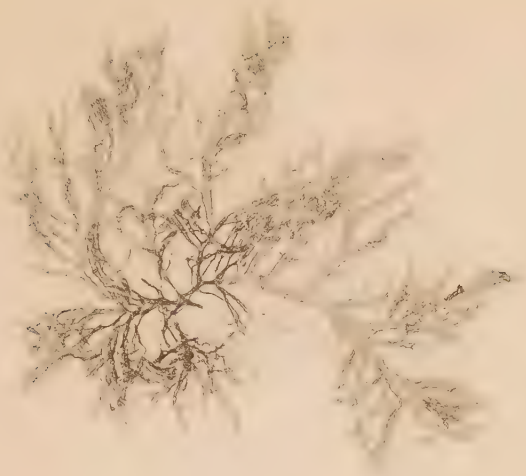

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PLATE 28

Calosiphonia verticillifera (J. Ag.) Setchell

10. Habit of a specimen, collected by Dr. W. G. Farlow at Coopers Island, Bermuda, in 1881. × $\frac{125}{157}$ diam.

Photograph, through the kindness of Mr. M. B. Nichols.

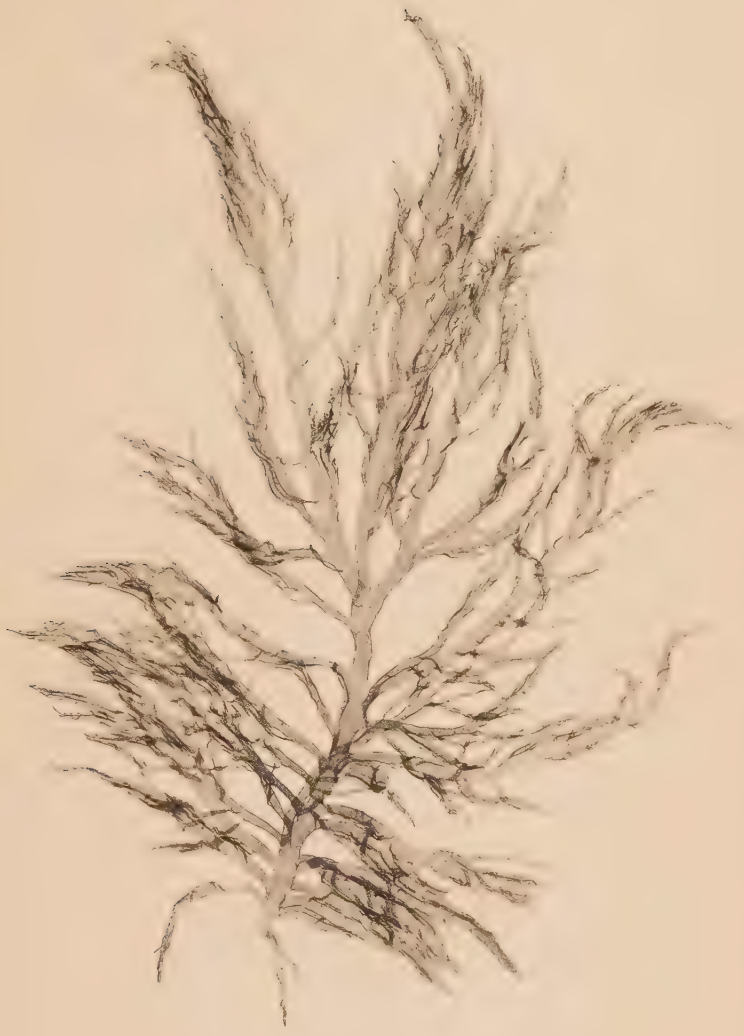

PLATE 29

Baylesia plumosa Setchell

11. Habit of a typical plant, collected at Pacific Grove, California, by W. A. Setchell. × $\frac{2}{3}\frac{2}{7}$ diam.

Photograph, through the kindness of Mr. M. B. Nichols.

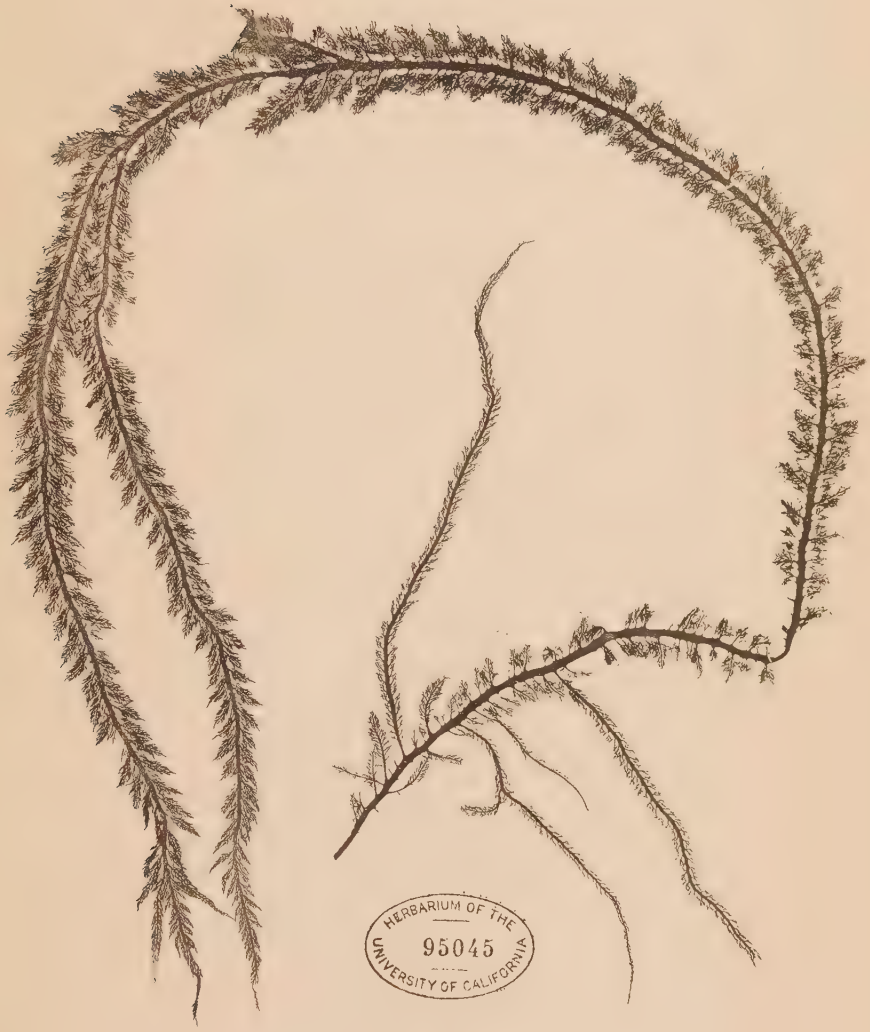

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PLATE 30

Leptocladia conferta Setchell

12. Habit of a typical plant, collected at Dillon's Beach, Marin County, California, by W. A. Setchell. × $\frac{2}{3}\frac{5}{9}$ diam.

Photograph, through the kindness of Mr. M. B. Nichols.

COCKAYNE — BOSTON

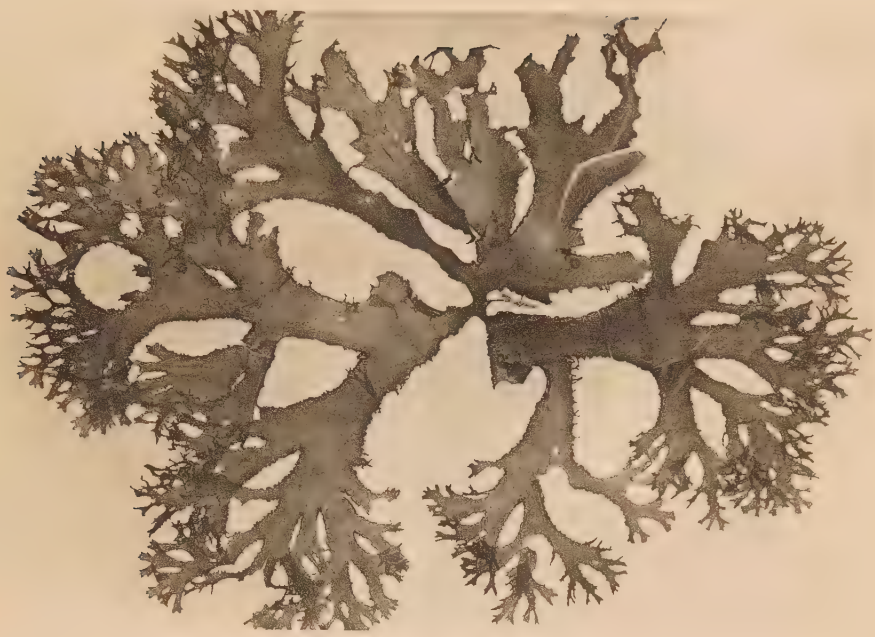
PLATE 31

Fauchea Fryeana Setchell

13. Habit of cystocarpic type specimen. × $\frac{4}{13}$ diam.

14. Habit of tetrasporic plant somewhat younger than the type specimen, but a cotype. × $\frac{2\,3}{3\,8}$ diam.

Photographs, through the kindness of Mr. M. B. Nichols.



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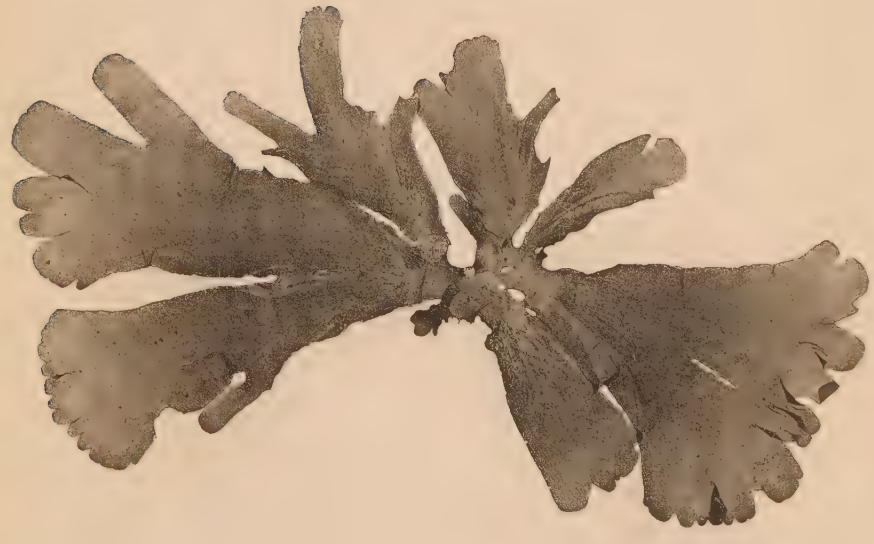

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